Release notes for ENDF/B Development n-007_N_015 evaluation

April 26, 2017

- `fudge-4.0` Warnings:

  1. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 2 ((z,n)): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

  2. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 3 (n[multiplicity:'2'] + N14 + gamma): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

  3. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 4 (n + He4 + B11 + gamma): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

  4. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 5 (n + H1 + C14 + gamma): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

  5. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 7 (H1 + (C15_s ->C15 + gamma)): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

  6. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 8 (H2 + (C14_s ->C14 + gamma)): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

  7. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 9 (H3 + (C13_s ->C13 + gamma)): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

  8. The ratio of smallest/largest eigenvalue is quite small, possibly leading to numerical instability in downstream codes.
     Section 10 (He4 + (B12_s ->B12 + gamma)): / Form 'eval': (Error # 0): Condition num.

     ```
     WARNING: Ratio of smallest/largest eigenvalue (0.000000e+00) is too small
     ```

- `fudge-4.0` Errors:

1. Calculated and tabulated Q values disagree.
   reaction label 9: n[multiplicity:'2'] + N14 + gamma (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: -11068905.15035629 eV vs -1.0833e7 eV!
   ```

2. Calculated and tabulated Q values disagree.
   reaction label 10: n + H1 + C14 + gamma (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: -10443034.53305817 eV vs -1.0207e7 eV!
   ```

3. Calculated and tabulated Q values disagree.
   reaction label 11: N16 + gamma (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: 2253488.757795334 eV vs 2.49e6 eV!
   ```

4. Calculated and tabulated Q values disagree.
   reaction label 12: n + He4 + B11 + gamma (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: -11227016.60523987 eV vs -1.0991e7 eV!
   ```

5. Calculated and tabulated Q values disagree.
   reaction label 13: H1 + (C15_s ->C15 + gamma) (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: -9224967.795646667 eV vs -8.9893e6 eV!
   ```

6. Calculated and tabulated Q values disagree.
   reaction label 14: H2 + (C14_s ->C14 + gamma) (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: -8218468.432123184 eV vs -7.9828e6 eV!
   ```

7. Calculated and tabulated Q values disagree.
   reaction label 15: H3 + (C13_s ->C13 + gamma) (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: -10137671.16719246 eV vs -9.902e6 eV!
   ```

8. Calculated and tabulated Q values disagree.
   reaction label 16: He4 + (B12_s ->B12 + gamma) (Error # 0): Q mismatch

   ```
   WARNING: Calculated and tabulated Q-values disagree: -7856668.319725037 eV vs -7.6215e6 eV!
   ```

- `njoy2012` Warnings:

1. This nuclide has no URR and NJOY is upset about it
   unresr...calculation of unresolved resonance cross sections (0): No URR

   ```
    ---message from unresr---mat  728 has no resonance parameters
                             copy as is to nout
   ```

2. Information only.
   heatr...prompt kerma (0): HEATR/gheat (1)

   ```
    ---message from gheat---no file 12 for this material.
   ```

3. This nuclide has no URR and NJOY is upset about it
   purr...probabalistic unresolved calculation (0): No URR

```
---message from purr---mat  728 has no resonance parameters
                         copy as is to nout
```

4. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
groupr...compute self-shielded group-averaged cross-sections (0): GROUPR/conver (0)

```
---message from conver---cannot do complete particle production for mt= 16
                         only mf4/mf5 provided
```

5. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
groupr...compute self-shielded group-averaged cross-sections (1): GROUPR/conver (0)

```
---message from conver---cannot do complete particle production for mt= 22
                         only mf4/mf5 provided
```

6. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
groupr...compute self-shielded group-averaged cross-sections (2): GROUPR/conver (0)

```
---message from conver---cannot do complete particle production for mt= 28
                         only mf4/mf5 provided
```

7. With the advent of the ENDF-6 format, it is possible to make evaluations that fully describe all the products of a nuclear reaction. Some carry-over evaluations from earlier ENDF/B versions also have this capability, but many do not. This message is intended to goad evaluators to improve things!
groupr...compute self-shielded group-averaged cross-sections (3): GROUPR/conver (0)

```
---message from conver---cannot do complete particle production for mt= 91
                         only mf4/mf5 provided
```

8. The evaluation was missing a file 12. This may be OK. Or not.
acer...monte carlo neutron and photon data (0): No MF12

```
message from gamsum---file 12 not found.
```

9. The number of coefficients is too big.
covr...process covariance data (1): COVR/matshd (3)

```
---message from matshd---   8 coefficients > 2
                         reset and continue
```